

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

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Phone: 860-594-3128

December 23, 2015

FTA No. CT-79-0003

Project No. 320-0003; New Haven State Street Rail Station Improvements, in the Town of New Haven.

NOTICE TO CONTRACTORS:

This is to notify all concerned and especially the prospective bidders that the bid opening for the subject project is still scheduled for January 20, 2016 at 2:00 P.M. in the Conference Room of the Department of Transportation Administration Building, 2800 Berlin Turnpike, Newington, Connecticut.

Addendum No. 1 is attached and can also be obtained on the Statewide Contracting Portal at http://www.biznet.ct.gov/scp_search/BidResults.aspx?groupid=64

This addendum is necessary to revised contract documents.

Bid Proposal Forms (0320-0003.EBS file and amendment file 0320-0003.00# if applicable) are available for those bidders that have received approval from the Department to bid on the subject project

Pre-Bid Questions and Answers: Questions pertaining to DOT advertised construction projects must be presented through the CTDOT Pre-Bid Q and A Website. The Department cannot guarantee that all questions will be answered prior to the bid date. **PLEASE NOTE - at 12:01 am, the day before the bid, the subject project(s) being bid will be removed from the Q and A Website, Projects Advertised Section, at which time questions can no longer be submitted through the Q and A Website. At this time, the Q and A for those projects will be considered final, unless otherwise stated and/or the bid is postponed to a future date and time to allow for further questions and answers to be posted.**

Philip J. Melchionne

For: Gregory D. Straka
Contracts Manager
Division of Contracts Administration

DECEMBER 23, 2015
NEW HAVEN STATE STREET RAIL STATION IMPROVEMENTS
FEDERAL AID PROJECT NO. CT-79-0003
STATE PROJECT NO. 0320-0003
CITY OF NEW HAVEN

ADDENDUM NO. 1

SPECIAL PROVISIONS
NEW SPECIAL PROVISION

The following CSI Special Provision is hereby added to the Contract:

- CSI SECTION 024119 – SELECTIVE DEMOLITION

REVISED SPECIAL PROVISIONS

The following CSI Special Provisions are hereby deleted in their entirety and replaced with the attached like-named CSI Special Provisions:

- CSI SECTION 071113 – BITUMINOUS DAMPROOFING
- CSI SECTION 079500 – EXPANSION CONTROL
- CSI SECTION 083326 – OVERHEAD COILING GRILLES
- CSI SECTION 104250 – SITE WAYFINDING & IDENTIFICATION SIGNAGE
- CSI SECTION 282301 – VIDEO SURVEILLANCE SYSTEM

CONTRACT ITEM
REVISED CONTRACT ITEM

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
<u>0202000</u>	<u>EARTH EXCAVATION</u>	<u>360 CY</u>	<u>380 CY</u>

PLANS
REVISED PLANS

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

02.01.A1

03.004.A1, 03.007.A1, 03.008.A1, 03.009.A1, 03.010.A1, 03.018.A1, 03.019.A1,
03.020.A1, 03.021.A1,

11.007.A1, 11.008.A1, 11.011.A1, 11.012.A1, 11.016.A1, 11.019.A1, 11.020.A1,
11.021.A1, 11.022.A1, 11.023.A1, 11.024.A1, 11.025.A1, 11.026.A1, 11.029.A1,
11.032.A1, 11.033.A1, 11.063.A1, 11.071.A1, 11.072.A1, 11.073.A1, 11.077.A1,
11.078.A1, 11.079.A1, 11.080.A1, 11.092.A1,

12.015.A1, 12.016.A1, 12.018.A1, 12.020.A1, 12.036.A1, 12.037.A1, 12.038.A1,
12.040.A1, 12.041.A1, 12.042.A1,

13.004.A1, 13.008.A1, 13.017.A1, 13.022.A1, 13.038.A1, 13.044.A1, 13.047.A1,

The Bid Proposal Form has been revised to reflect these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions of Division 1, State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816-2004 and supplemental specifications thereto, shall be a part of this specification.
- B. Work included in this section may require coordination with Amtrak regarding track outages, flagmen, or other issues related to work around railroad facilities. The Contractor shall pay special attention to the specification entitled, "SAFETY AND PROTECTION OF RAILROAD TRAFFIC AND PROPERTY" and other Amtrak Specifications contained in the Contract.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of selective demolition activities with starting and ending dates for each activity.

- E. Predemolition photographs or video.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.
- A. QUALITY ASSURANCE Source limitations: obtain products from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.8 WARRANTY

- A. Refer to form 816 Article 1.20-1.06.05 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.
- C. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain fire watch during and for at least one hour after flame-cutting operations.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site.
 - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 – 2004, and supplemental specifications thereto, shall be a part of this specification.
- B. Work included in this section may require coordination with Metro-North Railroad regarding track outages, flagmen, or other issues related to work around railroad facilities. The Contractor shall pay special attention to the Notices to Contractor and other specifications in the Contract.

1.2 SUMMARY

- A. Section Includes:
 - 1. Hot-applied asphalt dampproofing.
 - 2. Cold-applied, cut-back-asphalt dampproofing.
 - 3. Cold-applied, emulsified-asphalt dampproofing.

1.3 ACTION SUBMITTALS

- A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data: For each type of product.

1.4 INFORMATION SUBMITTALS

- A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

1.5 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain products from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Refer to Form 816 Article 1.06.03 and Form 816 Article 1.20-1.06.03 for additional information.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course molded-sheet drainage panels and auxiliary materials recommended in writing by manufacturer of primary materials.
- B. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

2.2 HOT-APPLIED ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Owens Corning Roofing and Asphalt, LLC; Trumbull Division.
- B. Hot-Applied Asphalt: ASTM D 449, Type II.

2.3 COLD-APPLIED, CUT-BACK-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. APOC, Inc.; a division of Gardner-Gibson.
 - 2. BASF Construction Chemicals - Building Systems; Sonneborn Brand Products.
 - 3. Brewer Company (The).
 - 4. ChemMasters, Inc.
 - 5. Euclid Chemical Company (The); an RPM company.
 - 6. Henry Company.
 - 7. Karnak Corporation.
 - 8. Koppers Inc.
 - 9. Malarkey Roofing Products.
 - 10. Meadows, W. R., Inc.
- B. Trowel Coats: ASTM D 4586, Type I, Class 1, fibered.

- C. Brush and Spray Coats: ASTM D 4479, Type I, fibered or nonfibered.

2.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 1. APOC, Inc.; a division of Gardner-Gibson.
 2. BASF Construction Chemicals - Building Systems; Sonneborn Brand Products.
 3. Brewer Company (The).
 4. ChemMasters, Inc.
 5. Euclid Chemical Company (The); an RPM company.
 6. Gardner-Gibson, Inc.
 7. Henry Company.
 8. Karnak Corporation.
 9. Koppers Inc.
 10. Malarkey Roofing Products.
 11. Meadows, W. R., Inc.
- B. Trowel Coats: ASTM D 1227, Type II, Class 1.
- C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.5 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Cut-Back-Asphalt Primer: ASTM D 41.
- C. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
 1. Primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- E. Patching Compound: Epoxy or latex-modified repair mortar of type recommended in writing by dampproofing manufacturer.
- F. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C 578, Type X, 1/2 inch thick.

2.6 MOLDED-SHEET DRAINAGE PANELS

- A. Molded-Sheet Drainage Panel: Comply with Section 334600 "Subdrainage."
- B. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core; and with a vertical flow rate of 9 to 15 gpm per ft..
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. American Hydrotech, Inc.
 - b. Carlisle Coatings & Waterproofing Inc.
 - c. Grace, W. R., & Co. - Conn.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.
 - 1. Test for surface moisture according to ASTM D 4263.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.
- C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for substrate preparation, dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.

1. Apply dampproofing to provide continuous plane of protection.
2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. **Provide dampproofing at all footings and foundation walls** from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

C. **Provide dampproofing at exterior face of inner wythe of exterior masonry cavity walls**, lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat.
- B. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft..
- C. Concrete Backup for Precast Veneer Cladding: Apply one brush or spray coat at not less than 1 gal./100 sq. ft..
- D. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft.
- E. Interior Face of Exterior Concrete Walls: Where above grade and indicated to be furred and finished, apply one brush or spray coat at not less than 1 gal./100 sq. ft..

3.5 INSTALLATION OF PROTECTION COURSE

A. **Install protection course over completed-and-cured dampproofing.** Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

1. Install protection course on same day of installation of dampproofing (while coating is tacky) to ensure adhesion.

3.6 INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS

A. **Place and secure molded-sheet drainage panels over protection course**, with geotextile facing away from wall substrate, according to manufacturer's written instructions. Use adhesives or other methods that do not penetrate dampproofing. Lap edges and ends of

geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. Install protection course before installing drainage panels.

3.7 CLEANING

- A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071113

SECTION 079500 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 – 2004, and supplemental specifications thereto, shall be a part of this specification.
- B. Work included in this section may require coordination with Metro-North Railroad regarding track outages, flagmen, or other issues related to work around railroad facilities. The Contractor shall pay special attention to the Notices to Contractor and other specifications in the Contract.

1.2 SUMMARY

- A. Section Includes:
 - 1. Parking and open-air structure expansion control systems.
- B. Related Requirements:
 - 1. Section 022000, “Cast-in-Place Concrete”.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- B. Samples: For each exposed expansion control system and for each color and texture specified, full width by 6 inches long in size.
- C. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - 1. Manufacturer and model number for each expansion control system.
 - 2. Expansion control system location cross-referenced to Drawings.
 - 3. Nominal joint width.
 - 4. Movement capability.
 - 5. Classification as thermal or seismic.
 - 6. Materials, colors, and finishes.
 - 7. Product options.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
 - 2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Expansion control systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 - 2. Component Importance Factor is 1.5.

2.3 EXTERIOR EXPANSION CONTROL SYSTEMS

- A. Source Limitations: Obtain expansion control systems from single source from single manufacturer.
- B. Floor-to-Floor:
 - 1. Basis-of-Design Product: MM Systems Corporation 50 MM WAY, PENDERGRASS, Georgia 30567; 1-800-241-3460 or 706-824-7501, www.mmsystemscorp.com, heavy duty floor cover system, Model HDL 2-2.
 - 2. Design Criteria:
 - a. Nominal Joint Width: 2.0"
 - b. Minimum Joint Width: .375"
 - c. Maximum Joint Width: 4.0"
 - d. Movement Capability: 3.625"
 - e. Type of Movement: Thermal and Seismic.

- f. Metal: Stainless steel, AISI Type 316
 - 1) Finish: No. 2B.
 - g. Seal Material: Elastomeric.
 - 1) Color: As selected by Architect from manufacturer's full range.
- C. Floor-to-Wall:
 - 1. Basis-of-Design Product: MM Systems Corporation 50 MM WAY, PENDERGRASS, Georgia 30567; 1-800-241-3460 or 706-824-7501, www.mmsystemscorp.com, Ethylene-Vinyl-Acetate Foam Sealing System, Model EVA.
 - 2. Type: Preformed cellular foam.
 - a. Foam Material: Ethylene-vinyl-acetate copolymer.
 - 1) Color: Gray.
- D. Wall-to-Wall & Wall-to-Ceiling (Corners):
 - 1. Basis-of-Design Product: MM Systems Corporation 50 MM WAY, PENDERGRASS, Georgia 30567; 1-800-241-3460 or 706-824-7501, www.mmsystemscorp.com, Flushline System, Model FSWPL.
- E. Wall-to-Wall & Ceiling-to-Ceiling (Flush):
 - 1. Basis-of-Design Product: MM Systems Corporation 50 MM WAY, PENDERGRASS, Georgia 30567; 1-800-241-3460 or 706-824-7501, www.mmsystemscorp.com, Flushline System, Model FSWP.

2.4 ACCESSORIES

- A. Moisture Barriers: Manufacturer's standard moisture barrier consisting of a continuous, waterproof membrane within joint and attached to substrate on sides of joint below the primary cover.

2.5 MATERIALS

- A. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304 for plates, sheet, and strips.
 - 1. Remove tool and die marks and stretch lines or blend into finish.
- B. Elastomeric Seals: ASTM E 1783; preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Moisture Barrier: Flexible elastomeric material, EPDM, minimum 45 mils thick.
- D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

- E. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.
- C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to expansion control system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.
- C. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion control systems.
 - 1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 - 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper expansion control system installation and performance.
 - 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 - 4. Repair or grout blockout as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
 - 5. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
 - 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
 - 1. Provide in continuous lengths for straight sections.
 - 2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 - 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.

3.4 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

SECTION 083326 - OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 – 2004, and supplemental specifications thereto, shall be a part of this specification.
- B. Work included in this section may require coordination with Metro-North Railroad regarding track outages, flagmen, or other issues related to work around railroad facilities. The Contractor shall pay special attention to the Notices to Contractor and other specifications in the Contract.

1.2 SUMMARY

- A. Section Includes:
 - 1. Open-curtain overhead coiling grilles.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports and angle framing of grille opening.
 - 2. Section 087100 "Door Hardware" for keying to building keying system.

1.3 ACTION SUBMITTALS

- A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.

4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
 5. Show locations of controls, locking devices, and other accessories.
 6. Include diagrams for power, signal, and control wiring.
- D. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
1. Include similar Samples of accessories involving color selection.
- E. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
1. Open-curtain grille with full-size components consisting of rods, spacers, and links as required to illustrate each assembly.
 2. Bottom bar.
 3. Guides.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Regulatory Requirements: Comply with applicable provisions in ICC A117.1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain overhead coiling grilles from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling grille manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Overhead coiling grilles shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.3 OPEN-CURTAIN GRILLE ASSEMBLY

- A. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that interconnect with vertical links.
 1. Basis-of-Design Product: Overhead Door Corporation, 1-800-887-3667, www.OverheadDoor.com, Stainless Steel Security Grille, 671 Series.
- B. Operation Cycles: Grille components and operators capable of operating for not less than 20,000. One operation cycle is complete when a grille is opened from the closed position to the fully open position and returned to the closed position.
 1. Include tamperproof cycle counter.
- C. Grille Curtain Material: Stainless steel.
 1. Vertical Rod Spacing: Approximately 2 inches on center.
 2. Horizontal Link Spacing: Approximately 6 inches on center.
 3. Pattern: Straight lattice.
 4. Spacers: Metal tubes matching curtain material.
- D. Bottom Bar: Double angles, fabricated from stainless steel and finished to match grille.
- E. Curtain Jamb Guides: Stainless with exposed finish matching grille rods. Provide continuous integral wear strips or PVC inserts to prevent metal-to-metal contact and to minimize operational noise.
- F. Counterbalance: Helical torsion spring type. Counterbalance shall be housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03" per foot of span. Counterbalance shall be adjustable by means of an adjustable tension wheel.
- G. Hood: Heavy-gauge stainless steel with intermediate supports as required.
 1. Shape: Square.
 2. Mounting: Face of wall.
- H. Locking Devices: Equip grilles with locking device assembly.
 1. Locking Device Assembly: Cremone type, both jamb sides locking bars, operable from inside with thumb turn and outside with cylinder. Ensure thumb turn is tamperproof from exterior.
- I. Manual Grille Operator: Push-up operation.

J. Grille Finish:

1. Stainless-Steel Finish: No. 4 (polished directional satin).
2. PVC Spacers: Color as selected by Architect from manufacturer's full range.

2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 HOODS AND ACCESSORIES

- A. General: Form sheet metal hood to entirely enclose coiled grille and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging. Equip hood with 1/8" x 2" x 2" angle bridging fastened along top front edge, from head-plate to head-plate.
1. Stainless Steel: 0.04-inch- thick stainless-steel sheet, Type 316, complying with ASTM A 666.
- B. Push/Pull Handles: Equip push-up-operated or emergency-operated grille with lifting handles on each side of grille, finished to match grille.
- C. Pole Hooks: Provide pole hooks and poles for grilles more than 84 inches high.

2.6 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
1. Lock Cylinders: Cylinders specified in Section 087100 "Door Hardware" and keyed to building keying system.
 2. Keys: Three for each cylinder.

2.7 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Push-up Grille Operation: Lift handles and pull rope for raising and lowering grille, with counterbalance mechanism designed so that required lift or pull for grille operation does not exceed 20 lbf.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting location indicated.

3.3 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior doors and components to be weather-resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.4 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Perform maintenance, including emergency callback service, during normal working hours.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 104250 – SITE WAYFINDING & IDENTIFICATION SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY:

- A. This Section includes the following types of signs:
 - 1. Fabricated Aluminum Post and Panel Signs with Pre-cast concrete footings.
 - 2. Fabricated Station Information Display Case with pre-cast concrete footings and single sided exterior grade display cases.
 - 3. Fabricated Aluminum Post and Panel Signs
 - 4. Fabricated Post and Panel Signs with Ceiling or Canopy Mount
 - 5. Aluminum Sign Panels
 - 6. Zinc Sign Panels with Braille
 - 7. Applied Opaque Vinyl Graphics
- B. Related Sections include the following:
 - 1. Division 3 Section “Cast-In-Place Concrete” for sign foundations.
 - 2. Division 3 Section “Pre-cast Structural Concrete” for ID Sign foundation.
 - 3. Division 5 Section “Pipe and Tube Railings” for railing mounted panel signs

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 – 2004, and supplemental specifications thereto, shall be a part of this specification.
- B. Work included in this section may require coordination with Metro-North Railroad regarding track outages, flagmen, or other issues related to work around railroad facilities. The Contractor shall pay special attention to the Notices to Contractor and other specifications in the Contract.

1.3 SUBMITTALS:

- A. General: Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR—SUBMITTALS.
 - 1. Product data for each sign type specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide

certifications that all work has been designed and installed in accordance with ADA requirements.

2. Shop drawings showing fabrication and mounting methods for each sign type. Include plans, elevations, and large scale sections of typical components. Show anchors, layout, reinforcement, accessories and installation details.
 - a. Provide a measured layout for each sign required, and prepare full scale layouts of sample messages showing word and letter spacing.
 - b. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed.
 - c. Additions or modifications to details, which are necessary due to special conditions encountered during the site survey, shall be provided by the Contractor as part of the contract and at no additional cost to the State.
3. Materials List: Submit complete list of all materials proposed to be furnished and installed under this Section, making all submittals and re-submittals in accordance with the provisions of the Contract Documents and submit a notarized Certificate of Compliance.
4. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
 - a. Submit 4" x 4" color samples of each specified finish including paints, applied vinyl, and aluminum.
 - b. Typical mounting brackets.
 - c. Submit a complete sample alphabet of each typeface and pictogram specified (1" minimum height).
 - d. Submit an 8-1/2" x 11" color print of each specified logotype, to include any modifications as required.
 - e. Catalog Cuts: Catalog cuts shall be marked to indicate the item, model, capacities and other characteristics listed in the table or on printed sheets.
5. As part of Shop Drawing submission provide a detailed schedule of proposed times and dates for the installation of signage. Schedule shall be submitted for review and approval. All work shall be performed in accordance with any modifications affected by train schedule.

1.4 QUALITY ASSURANCE:

- A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.
- B. Source Limitations: For each separate sign type required, obtain signs from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.
- C. Comply with the Department of Transportation ADA Standards for Transportation Facilities — the 2006 DOTAS and all other applicable codes with regard to signage, as well as any and all subsequent appendices, addenda or revisions.
- D. For actual fabrication of the signage package, use only mechanics that are thoroughly trained and experienced in the skills required for the manufacture and fabrication of the units. In acceptance or rejection of the manufactured units, no allowance will be made for lack of skill on the part of the fabricator/manufacturer.
- E. Tolerances:
 - 1. Sign Panels
 - a. The Contractor shall note on the shop drawings all fabrication tolerances including, but not limited to: plumb, thickness, length, width, square-ness, camber, and flat-ness.
 - b. Signs shall be free of defects including, but not limited to: buckles, dents, warps, wrinkles, and burrs.
 - 2. Messages
 - a. Message Location: $\pm 1/16$ inch from the location as shown.
 - b. Line-to-Line: $\pm 1/32$ inch between each line and $\pm 1/16$ inch over entire message.
 - c. Letter-to-Letter or Symbol (horizontally and vertically): $\pm 1/32$ inch between each letter or symbol and $\pm 1/16$ inch over an entire line.
 - 3. All sign face panels shall be of a single sheet. Joined pieces will not be accepted.
 - 4. Design components to allow for expansion and contraction for temperatures ranging between -20°F and +120°F, without causing buckling, opening of joints, or overstressing of welds and fasteners.

5. Comply with AWS D1.2 for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded joints of all welding flux and dress on all exposed and contact surfaces.
 6. Mill joints to a tight, hairline fit. Cope or miter corner joints.
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- F. The Contractor shall have all mounting and fabrication details and calculations designed, stamped and approved by a currently licensed Professional Engineer (PE), and reviewed and approved by the Engineer.
 - G. Structural Performance: Structural elements shall withstand the effects of gravity, wind, seismic, snow, and ice loads as per the Connecticut State Building Code. At a minimum, the signs must withstand a wind load of 20lbs/sf and horizontal/vertical loads of 250lbs/sf at top center of the sign with a maximum deflection of 1/360 of sign height. Calculations are to be submitted to the Engineer for review.
 - H. Manufacturer is to provide a five (5) year unconditional guarantee for said units against any defects in workmanship or fabrication.
 - I. The State reserves the right to retain an independent testing service to inspect the manufacturing process to ensure conformity to the Contract Documents.
 - J. The Contractor shall have in effect a Quality Assurance (QA) program clearly defining the procedures and requirements necessary to ensure that all aspects of the Work are accomplished in accordance with the Contract Documents. The Contractor will submit a copy of its QA program to the Engineer within fifteen (15) days after receipt of Notice of Award, for review and approval.
 - K. Minor deviations from the specifications will be accepted to utilize a manufacturer's standard product only when approved in advance on a shop drawing as a substitution and when in the judgment of the Designer such deviations do not materially detract from the Design Concept or the intended performance.
 - L. The Contractor shall be responsible for the quality of all materials and workmanship required for the execution of this contract, including the materials and workmanship of any firms or individuals who act as its Subcontractors. The Contractor shall be responsible for providing Subcontractors with complete and up-to-date drawings, specifications, message schedules and other information issued by the Designer.
 - M. No fabrication or installation materials or methods shall be used that will change the visual quality or in any manner have an adverse effect on existing materials and surfaces. The Contractor is responsible for the structural stability of all signs and mounting there-of. All damaged surfaces and materials shall be restored to their original condition and appearance by the Contractor.

1.5 PROJECT CONDITIONS:

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.
- B. The Contractor shall provide adequate staff to take measurements and notes to determine sign locations and conditions.

1.6 REFERENCES:

- A. American Society for Testing Materials (ASTM)
- B. American Welding Society (AWS) – Structural Welding Code
- C. Americans with Disabilities Act – 1990 and the subsequent Department of Justice *2010 ADA Standards for Accessible Design*
- D. ANSI A-1171-2003 – Specifications for Sign Requirements for the Physically Handicapped.
- E. Americans with Disabilities Act Architectural Guidelines (ADAAG)

1.7 DELIVERY, STORAGE AND HANDLING:

- A. Refer to Form 816 Article 1.06.03 and Form 816 Article 1.20-1.06.03 for additional information.
- B. Deliver signs in factory-fabricated containers or wrappings, which offer proper protection from construction debris and physical damage.
- C. Store items in original wrappings in a clean dry place. Protect from weather, dirt, fumes, and water and other abuses of the environment
- D. Handle carefully to prevent damage, breaking and soiling. Do not install damaged units or components, replace with new.
- E. Replacements: In the event of damage, repair will be subject to the State's discretion as to whether replacement or repair will be the procedure for damaged units, and to be provided by the Contractor at no additional cost to the State.

1.8 SCHEDULE OF MANUFACTURE:

- A. The contractor shall submit a schedule of completion and sequence of delivery. This schedule shall include but not be limited to the following:

1. Preparation of Shop Drawings and review and approval of Shop Drawings.
2. Final approval, manufacture and sequence of delivery, unless otherwise indicated on the approved Construction Schedule.

1.9 DELIVERY OF UNITS:

- A. Contractor shall be responsible for handling and storage. The State shall not be responsible until installed and accepted.

1.10 WARRANTY:

- A. Refer to Form 816, Article 1.20-1.06.08 and the NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.
- B. Provide a written warranty issued in the name of the State and jointly signed by the supplier stating that the signs have a guaranteed life of five years against fading, spalling, discoloration, staining, gloss reductions, or rusting from date of substantial performance.

1.11 PERMITS:

- A. Contractor shall secure and pay for all permits, licenses and approvals necessary for the execution of the contract, in conformance with the rules and regulations pertaining to the performance of the work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with the requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 1. Fabricated Aluminum Post and Panel Signs with Pre-cast concrete footings.
 - a. Sign Pro, 60 Westfield Drive, Plantsville, CT (800) 229-1812
 - b. Laurentano Sign Group, 1 Tremco Drive, Terryville, CT (860) 582-0233
 - c. ID Resources, PO Box 127, Peterborough, NH (603) 924-3371
 2. Single-sided Exterior Grade Display Cases:
 - a. Nelson Harkins, Chicago Illinois, phone 1-800-882-8989
 - b. Tablet & Ticket Company, Chicago Illinois, phone 1-800-438-4959

- c. Poblocki & Sons, Milwaukee Wisconsin, phone (414) 453-4010
- 3. Fabricated Aluminum Post and Panel Signs:
 - a. Howard Industries, Fairview, PA
 - b. Sign Comp, Comstock Park, Michigan
 - c. Admiral Plastics, Cape Girardeau, Missouri
- 4. Aluminum Regulatory Sign Panels with Applied Vinyl Graphics
 - a. Seton Identification Products, Branford, CT
 - b. Vulcan Signs, Foley, Alabama
 - c. Best Manufacturing Sign Systems, Montrose, Colorado
- 5. Aluminum Regulatory Signs, Post Mounted with Applied Vinyl Graphics
 - a. Sign Pro, 60 Westfield Drive, Plantsville, CT (800) 229-1812
 - b. Laurentano Sign Group, 1 Tremco Drive, Terryville, CT (860) 582-0233
 - c. ID Resources, PO Box 127, Peterborough, NH (603) 924-3371

2.2 MATERIALS:

A. Aluminum:

- 1. Aluminum sheet shall be of thickness and sizes shown, constructed of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15, or as noted on drawings.
- 2. Aluminum extrusions shall be of alloy and temper recommended by the manufacturer for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T52 ST, or as noted on drawings.
- 3. All Metal: to be free of stain, warp-age and any defects impairing strength, durability and appearance.

B. Paint:

- 1. Paint system to be low VOC, ultraviolet inhibited aliphatic acrylic polyurethane applied over pretreatment coating and primers, as appropriate for each sign substrate material. All signs are clear coated with low VOC satin clear unless indicated otherwise on design intent drawings. Colors to match as follows.
 - a. Satin Blue = Matthews Paint to match PMS #293
 - b. Satin Silver = Matthews Paint VOC# MP18073
 - c. Satin Red = Matthews Paint to match PMS# 185

- d. Satin White = Matthews Paint VOC# SV202SP
 - e. Satin Black = Matthews Paint VOC# SV923SP
 - f. Satin Clear Coat = Matthews Paint VOC# Satin Clear 281228
2. Exact identification of all paints to be noted on the shop drawings, with data describing method of application if other than air drying. Paint finish on signs shall be surface sprayed and have a consistent satin finish, free of dirt, grit, mottling, etc. Each paint coat shall contain ultra-violet inhibitors and shall be applied with sufficient time allowed between applications for proper curing. Provide barrier coats over incompatible primers or remove and re-prime as required.

C. Acrylic:

- 1. Cast acrylic sheet: Provide cast transparent methyl methacrylate monomer plastic sheet with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790 and a minimum allowable continuous service temperature of 80 degrees C. Where sheet material is indicated as "clear," provide colorless sheet in matte finish, with light transmittance of 92% when tested according to the requirements of ASTM D 1003.
- 2. All acrylic panels to be free of stain, warp-age and any defects impairing strength, durability and appearance.
- 3. Finish is to be uniform on face and edges, unless otherwise specified.
- 4. All colored coatings, including inks and paints and films, for copy and background colors, to be of a type recommended by acrylic manufacturers for optimum adherence to acrylic surface and nonfading for the application intended.

D. Opaque Vinyl Lettering:

- 1. All opaque vinyl lettering to be die-cut from opaque, non-reflective vinyl film as manufactured by 3M Co., or approved equal. Vinyl shall have a matte finish with a .003 to .006 thickness and shall match colors indicated on drawings. No hand cut letters will be accepted. Messages to be pre-spaced for application on site. Colors shall be as follows:
 - a. Blue = 3M Scotchcal to match PMS #293
 - b. Red = 3M Scotchcal to match PMS# 185
 - c. White = 3M Scotchcal Electrocut Film 7725-10
 - d. Black = 3M Scotchcal Electrocut Film 7725-12

E. Reflective Vinyl Lettering:

- 1. Reflective Vinyl Lettering: All reflective vinyl lettering to be 3M Company, or approved equal, engineering grade reflective vinyl with clear pressure sensitive

adhesive backing and carry a minimum 5 year material warranty. Letters to conform with the specified typeface. Colors shall be as follows:

- a. White = 3M Scotchlite Reflective Vinyl 680-10
- b. Black = 3M 3M Scotchlite Reflective Vinyl 680-85
- c. Red = 3M Scotchlite Reflective Vinyl to match PMS #185

F. Mounting Materials:

- 1. Mechanical Mounting: Corrosion resistant fasteners of a type recommended by the manufacturer for use in the type of substrate encountered at each location.
- 2. Adhesives: Where adhesive mounting techniques are required, the Contractor shall use adhesives specifically designed for compatibility with the base materials and the desired adhesive strength in accordance with recommendations made by the manufacturer of the materials specified to be laminated or adhered. No adhesives that will fade, discolor or de-laminate as a result of proximity to ultraviolet light source or heat or cold shall be used. No adhesives shall change the color or deteriorate the materials to which they are applied. All adhesives shall be of a non-staining, non-yellowing quality and all visible joints shall be free from air bubbles and other defects. All adhesives shall be tested on site. All adhesives shall be indicated in the shop drawings.

G. Welding:

- 1. Fabrication shall be accomplished using the highest standards of workmanship. All pieces shall be cut and carefully fit together. All visible connections shall be full welded and ground smooth. All visible surfaces and connections shall be without visible grounding marks, surface differentiation or variation.
- 2. All metal to be free of stain, warp-age and any defects impairing strength, durability and appearance.
- 3. All welds to comply with the recommendations of the AWS.

H. Fasteners:

- 1. Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.

I. Anchors and Inserts:

- 1. Use nonferrous metal or hot-dipped galvanized anchors and inserts as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.3 GRAPHIC PROCESS TYPES:

A. Applied Vinyl:

1. All vinyl lettering to be reflective or opaque, as noted on the drawings, and to be die-cut.
2. No hand cut letters will be accepted.
3. Messages to be pre-spaced for application on site.

2.4 GRAPHIC REQUIREMENTS:

A. Typeface: The typefaces shall conform to the type specifications in this sign package. Alternate type will not be accepted. Type for signs shall match Adobe Type Library fonts (Adobe Systems, Inc.):

1. Futura Heavy
2. Futura Bold

B. Letter and Word Spacing: shall be optical but in conformance with the examples shown on the drawings.

C. All Letterforms: shall be aligned to maintain a baseline parallel to the sign format.

D. Letter Size: to be determined by the height of the upper case 'E' of the letterform.

E. Messages: on drawings are for demonstration purposes only. In all cases refer to the Sign Schedule for messages to be used on the finished signs.

F. Symbols are based on the "*System of Passenger/Pedestrian Orientation Symbols*" developed for the Department of Transportation by the American Institute of Graphic Arts and the Society of Environmental Graphic Design's symbols of accessibility.

2.5 FABRICATION:

A. Fabricate Sign Units of graphic process, design, copy, dimensions and color indicated or specified.

B. Copy shall be as stated in message schedule.

1. Confirm "TBD", to be determined, information before fabrication.

C. Artwork:

1. All artwork, unless specifically noted otherwise, shall be the sole responsibility of the Contractor.
2. Where noted on the drawings, the Contractor shall coordinate and obtain from CTDOT, authorized artwork of the Connecticut Commuter Rail logo, for reference only. Creation of production ready artwork is the sole responsibility of the contractor.
3. Full size color proofs of all artwork, printed on high quality paper, to be submitted for approval prior to fabrication.

PART 3 - EXECUTION

3.1 REMOVAL/DEMOLITION

- A. Fabricator to remove all existing signs and sign mounting hardware from existing State Street Station with the exception of existing illuminated "EXIT" signs.
- B. Surfaces on which signs were mounted are to be cleaned and restored as closely as possible to original condition prior to installation of new sign system.
- C. Signs and hardware are to be disposed of appropriately in conformance with all State and Federal requirements for disposal of such materials.

3.2 PRE-INSTALLATION:

- A. The locations of signs shown on the drawings are for general information only. It is the responsibility of the Contractor to coordinate with the Owner to determine final locations of signs in the field.
- B. The Designer shall be notified of any discrepancies in the drawings, in field dimensions or conditions and/or changes in construction drawings prior to fabrication and/or installation.
- C. The Contractor shall examine the areas and conditions under which work of this section is to be performed and correct any conditions detrimental to the timely and proper completion of the work.
- D. The Contractor shall not install signs until adjacent finish work is completed.

3.3 INSTALLATION:

- A. Installation of components to be in compliance with manufacturer's instructions, unless otherwise specified.

- B. Signs shall be installed level and plumb with the orientation shown on the drawings, unless directed otherwise by the owner, with sign surfaces free from distortion or other defects in appearance.
- C. Exposed surfaces of fasteners should be field coated with paint to match the surrounding surface color; exposed threads to be protected from paint to allow future maintenance of signs.
- D. Anchor bolts and nuts to be coated with corrosion-resistant grease to allow future maintenance of signs.
- E. Contractor to provide repair and touch up prior to and after punch list inspection.
- F. Contractor to be responsible for the removal of all crating and debris from the project site upon completion.




3.4 CLEANING AND PROTECTION:

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect signs from damage until acceptance by the State.

























NHHS
New Haven - State Street

Type	Description	Comments
A1a	Branded City Identifier	
A3	Track Identifier	
A9	Directional Stacked	
A11	Station Information Display Case	
A12	ADA City Identifier	
B1	Overhead Directional (1) Message	
B2	Overhead Directional (2) Messages	
B15.1	Area of Refuge	
B15.2	Accessible Route	
B19	Permanent Room Identifier	
C1	Designated HC Drop-off and Pick-up	
C3	Vehicular Directional	
C20	ADA Station Entrance Identifier	
D1	No Smoking	
D2.1	In Case of Fire	
D2.2	Smoke Free Facility	
D4	Platform End Restrictive Sign	
D6	Unattended Baggage	





NHHS
New Construction
New Haven - State Street

Type	Tag	Level	Message side "A"	Message side "B"	Comments
A1a	A1a-01	PLAT	(orb) CT rail New Haven - State St	(none)	Rail Mounted
A1a	A1a-02	PLAT	(orb) CT rail New Haven - State St	(none)	Provide 1/4" aluminum sign panel fastened to equipment screen framing
A1a	A1a-03	PLAT	(orb) CT rail New Haven - State St	(none)	Provide 1/4" aluminum sign panel fastened to equipment screen framing
A1a	A1a-04	PLAT	(orb) CT rail New Haven - State St	(none)	Rail Mounted
A1a	A1a-05	PLAT	(orb) CT rail New Haven - State St	(none)	Rail Mounted
A1a Count	3				
A3	A3-02	PLAT	Track 1	Track 1	Canopy Mounted
A3	A3-03	PLAT	Track 1	Track 1	Canopy Mounted
A3	A3-04	PLAT	Track 1	Track 1	Canopy Mounted
A3 Count	3				
A9	A9-01	PLAT	(Buses/Taxis) (Pass. PU/DO)  → Exit	(none)	Rail Mounted
A9	A9-02	PLAT	(Buses/Taxis) (Pass. PU/DO)  → Exit	(none)	Provide 1/4" aluminum sign panel attached to surface of equipment screen with hidden metal fasteners
A9	A9-03	PLAT	←  (Buses/Taxis) (Pass. PU/DO) Exit	(none)	Rail Mounted

NHHS
New Construction
New Haven - State Street

A9	A9-04	PLAT	 (Buses/Taxis) (Pass.PU/DO) Exit	(none)	Rail Mounted
A9 Count	4				
A11	A11-01	PLAT	(CT RAIL LOGO AND SUPPLEMENTAL INFORMATION)	(none)	Free Standing
A11	A11-02	PLAT	(CT RAIL LOGO AND SUPPLEMENTAL INFORMATION)	(none)	Free Standing
A11 Count	2				
A12	A12-01	PLAT	NEW HAVEN - STATE STREET (Grade 2 Braille)	(none)	Wall Mounted
A12 Count	1				
B2	B2-01	TOWER	   Exit and Tracks 4 & 6   Track 1	(none)	Wall Mounted
B2	B2-02	TOWER	   Track 1   Exit and Tracks 4 & 6	(none)	Wall Mounted
B2	B2-03	BRIDGE	   Track 1	  Exit   Tracks 4 & 6	Canopy Mounted
B2 Count	3				
B15.1	B15.1-01	PLAT	 Area of Refuge	(none)	Rail Mounted
B15.1	B15.1-02	PLAT	 Area of Refuge	(none)	Rail Mounted
B15.1 Count	2				
B15.2	B15.2-01	TOWER	 	(none)	Wall Mounted
B15.2	B15.2-02	TOWER	 	(none)	Wall Mounted
B15.2 Count	2				
B19	B19-01	TOWER	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted
B19	B19-02	TOWER	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted



NHHS
New Construction
New Haven - State Street

B19	B19-03	TOWER	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted
B19	B19-04	TOWER	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted
B19 Count	4				
D1	D1-01	PLAT		(none)	Provide 1/4" aluminum sign panel attached to surface of equipment screen with hidden metal fasteners
D1	D1-02	PLAT		(none)	Rail Mounted
D1 Count	2				
D2.1	D2.1-01	TOWER	 In Fire Emergency Do Not Use Elevator Use Exit Stairs	(none)	Wall Mounted
D2.1	D2.1-02	TOWER	 In Fire Emergency Do Not Use Elevator Use Exit Stairs	(none)	Wall Mounted
D2.1 Count	2				
D4	D4-01	PLAT	(Exclamation Point Symbol) AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Rail Mounted
D4	D4-01	PLAT	(Exclamation Point Symbol) AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	
D4 Count	1				















NHHS
New Construction
New Haven - State Street

D6	D6-01	PLAT	WARNING ALL UNATTENDED BAGGAGE WILL BE SEIZED AND SEARCHED	(none)	Provide 1/4" aluminum sign panel attached to surface of equipment screen with hidden metal fasteners
D6	D6-02	PLAT	WARNING ALL UNATTENDED BAGGAGE WILL BE SEIZED AND SEARCHED	(none)	Wall Mounted
D6 Count	2				


















NHHS
Existing Station
New Haven - State Street

Type	Tag	Level	Message side "A"	Message side "B"	Comments
A1a	005	PLAT	(orb) CT rail New Haven - State St	(orb) CT rail New Haven - State St	Post Mounted on Platform No foundation required
A1a	006	PLAT	(orb) CT rail New Haven - State St	(orb) CT rail New Haven - State St	Post Mounted on Platform No foundation required
A1a	017	PLAT	(orb) CT rail New Haven - State St	(orb) CT rail New Haven - State St	Post Mounted on Platform No foundation required
A1a Count	3				
A3	007	PLAT	← Track 6	Track 6 →	Canopy Mounted
A3	010	PLAT	Track 4 →	← Track 4	Canopy Mounted
A3	013	PLAT	← Track 6	Track 6 →	Canopy Mounted
A3	016	PLAT	Track 4 →	← Track 4	Canopy Mounted
A3	023	PLAT	← Track 6	(none)	Wall Mounted flush left at top of wall
A3	025	PLAT	Track 4 →	(none)	Wall Mounted flush left at top of wall
A3 Count	6				
A9	004	PLAT	(Buses/Taxis) (Pass. PU/DO)  → Exit	←  (Buses/Taxis) (Pass. PU/DO) Exit	Canopy Mounted








NHHS
Existing Station
New Haven - State Street

A9	018	PLAT	←  (Buses/Taxis) (Pass. PU/DO) Exit	(Buses/Taxis) (Pass. PU/DO)  → Exit	Canopy Mounted
A9	020	PLAT	← EXIT  →  	(none)	Wall Mounted
A9	021	PLAT	←  EXIT →  	(none)	Wall Mounted
A9	031	PLAT	←  EXIT →  	(none)	Wall Mounted
A9	032	PLAT	← EXIT  →  	(none)	Wall Mounted
A9 Count	6				
A11	047	SITE	(CT RAIL LOGO AND SUPPLEMENTAL INFORMATION)	(none)	Free Standing
A11 Count	1				
A12	008	PLAT	NEW HAVEN - STATE STREET (Grade 2 Braille)	(none)	Wall Mounted
A12	009	PLAT	NEW HAVEN - STATE STREET (Grade 2 Braille)	(none)	Wall Mounted
A12	014	PLAT	NEW HAVEN - STATE STREET (Grade 2 Braille)	(none)	Wall Mounted
A12	015	PLAT	NEW HAVEN - STATE STREET (Grade 2 Braille)	(none)	Wall Mounted
A12 Count	4				

NHHS
Existing Station
New Haven - State Street

B2	024	PLAT	  Track 1   Exit to Street	(none)	Wall Mounted Above Door
B2	033	TOWER	 Tracks 4 & 6	(none)	Canopy Mounted
B2	036	TOWER	 Tracks 4 & 6	(none)	Canopy Mounted
B2	039	BRIDGE	 Tracks 4 & 6	  Track 1  Exit to Street	Canopy Mounted
B2	045	BRIDGE	 Tracks 4 & 6	  Track 1  Exit to Street	Canopy Mounted
B2 Count	5				
B19	022	PLAT	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted
B19	029	PLAT	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted
B19	030	PLAT	AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Wall Mounted
B19 Count	3				
C1	052	SITE	 Reserved Drop-off and Pick-up	(none)	Flag Mounted
C1 Count	1				
C3	048	SITE	(train symbol)  Entrance to → Station	← (train symbol)  Entrance to Station	Post Mounted

NHHS
Existing Station
New Haven - State Street

C3	050	SITE	(train symbol)  Entrance to → Station	(none)	Post Mounted
C3 Count	2				
C20	046	BRIDGE	NEW HAVEN - STATE STREET STATION (Grade 2 Braille)	(none)	Wall Mounted
C20 Count	1				
D1	026	PLAT		(none)	Wall Mounted
D1	027	PLAT	ELEVATOR  (Grade 2 Braille)	(none)	Wall Mounted
D1	034	TOWER	ELEVATOR  (Grade 2 Braille)	(none)	Wall Mounted
D1	037	TOWER		(none)	Wall Mounted
D1 Count	4				
D2.1	028	PLAT	 In Fire Emergency Do Not Use Elevator Use Exit Stairs	(none)	Wall Mounted
D2.1	035	TOWER	 In Fire Emergency Do Not Use Elevator Use Exit Stairs	(none)	Wall Mounted
D2.1 Count	2				

NHHS
Existing Station
New Haven - State Street

D2.2	044	BRIDGE	 This is a Smoke-Free Facility	(none)	Wall Mounted
D2.2 Count	1				
D4	001	PLAT	(Exclamation Point Symbol) AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Screen Mounted
D4	019	PLAT	(Exclamation Point Symbol) AUTHORIZED PERSONNEL (Grade 2 Braille)	(none)	Screen Mounted
D4 Count	2				
	051	SITE	NO PARKING ANY TIME	(none)	WALL MOUNTED TO REMAIN
	053	SITE	NO PARKING ANY TIME	(none)	CTDOT STREET POST SIGN TO REMAIN
	054	SITE	NO PARKING ANY TIME	(none)	CTDOT STREET POST SIGN TO REMAIN

NHHS
Existing Station
New Haven - State Street

	055	SITE	NO PARKING ANY TIME	(none)	WALL MOUNTED TO REMAIN
	056	SITE	(LEFT ARROW WITH LINE THROUGH IT) NO LEFT TURN	(none)	CTDOT STREET POST SIGN TO REMAIN
	057	SITE	DO NOT ENTER	(none)	CTDOT STREET POST SIGN TO REMAIN
	058	SITE	STOP	(none)	CTDOT STREET POST SIGN TO REMAIN

END SECTION 104250

SECTION 282301 – VIDEO SURVEILLANCE SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. Drawings and general provisions of the Contract, including State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 – 2004, and supplemental specification thereto, shall be part of this specification.
- B. Work included in this section may require coordination with Metro-North Railroad regarding track outages, flagmen, or other issues related to work around railroad facilities. The Contractor shall pay special attention to the Notices to contractor and other specifications in the Contract.
- C. The Work specified in this Section consists of furnishing and installing communication conduit and cables, power conduit and cables, and camera for the Video Surveillance System (VSS) as indicated.

1.2 RELATED DOCUMENTS

- A. The Contractor shall pay special attention to the MNR Police Department requirements XX.

1.3 SUMMARY

- A. Section includes a stand alone, onsite video surveillance recording system consisting of IP Megapixel digital cameras, digital network video recorder, data transmission wiring, and a control station with its associated equipment.

1.4 DEFINITIONS

- A. AGC: Automatic gain control.
- B. BNC: Bayonet Neill-Concelman - type of connector.
- C. B/W: Black and white.
- D. FO: Fiber Optic.
- E. FTP: File transfer protocol.
- F. IP: Internet protocol.
- G. LAN: Local area network.
- H. MPEG: Moving picture experts group.
- I. NTSC: National Television System Committee.
- J. PC: Personal computer.
- K. PTZ: Pan-tilt-zoom.
- L. RAID: Redundant array of independent disks.

M. TCP: Transmission control protocol - connects hosts on the Internet.

N. UPS: Uninterruptible power supply.

O. WAN: Wide area network.

P. FPS: Frames per Second.

1.5 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Video surveillance system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.6 ACTION SUBMITTALS

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

C. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
4. UPS: Load requirements for sizing calculations.
5. Wiring Diagrams: For power, signal, and control wiring.
6. Room HVAC requirements.

D. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

1.7 INFORMATIONAL SUBMITTALS

- A. A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Seismic Qualification Certificates: For video surveillance, cameras, camera-supporting equipment, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.
- D. Warranty: Sample of special warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Submit closeout submittals in accordance with Form 816 Article 1.20-1.05.02, NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.
- B. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, monitors, videotape recorders, digital video recorders, video switches, and control-station components to include in emergency, operation, and maintenance manuals. In addition to emergency, operation, and maintenance manuals include the following:
 - 1. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

1.9 QUALITY ASSURANCE

- A. Source limitations: Obtain products from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NECA 1.
- D. Comply with NFPA 70.

1.10 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus -40 to plus 140 deg F, dry bulb and 10 to 100 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph and snow cover up to 24 inches thick. Refer to drawings for enclosure type and requirements.
2. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.
3. NEMA 250 Type 4X, IP66 Certified, Vandal Resistant.

1.11 DELIVERY, STORAGE AND HANDLING

- A. Refer to Form 816 Article 1.06.03 and Form 816 Article 1.20-1.06.03 for additional information.

1.12 WARRANTY

- A. Refer to Form 816, Article 1.20-1.06.08, and the NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Three years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 BUY AMERICA COMPLIANCE

- A. Products must meet Buy America requirements. Refer to NOTICE TO CONTRACTOR – BUY AMERICA for additional information.

2.2 SYSTEM REQUIREMENTS

- A. Video-signal format shall comply with NTSC standard, composite interlaced video.
 1. H.264 (MPEG-4) Compression 1920 x 1200 at 30 FPS.
- B. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.
 1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Section 264313 "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits."
 2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Section 264313 "Transient-Voltage

Suppression for Low-Voltage Electrical Power Circuits" as recommended by manufacturer for type of line being protected.

2.3 CAMERAS

- A. Cameras for Platforms, Stair towers, Pedestrian Bridge, and Lobby areas shall be fixed dome HD network type cameras as manufactured by Verint or Axis, or equal in accordance with the following:
1. This work shall consist of furnishing and installing Fixed and PTZ Closed Circuit Tele vision (CCTV) Dome Camera Assemblies, camera mounting devices, infrared lights and other items at the field locations shown in the Plans and in accordance with the Contract Documents.
 2. All materials furnished, assembled, fabricated, or installed shall be new, corrosion resistant and in strict accordance with the details shown in the contract documents. The CCTV Dome Cameras and other items shall be fully compatible with each other and shall have the capability of being fully controlled by software and hardware being furnished under other Contract items. All cameras shall be compatible with the already existing system set up at State Street Rail Station.
 3. The equipment shall deliver high quality full-motion video during day or night operation with the video transmitted over fiber optic networks installed as part of this project as indicated in the Contract Documents.
 4. Cameras shall be IP-based and comply with established network and video standards. Cameras shall be powered by the switch utilizing the network cable as shown on the Contract Drawings. Power injectors (midspans) are not acceptable. Cameras shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications and ONVIF complaint.
 5. Each PTZ CCTV Dome Camera consists of a solid state color CCTV Camera, zoom lens, camera enclosure, pan/tilt drive and all cabling required to interface the CCTV dome camera assembly with equipment in the field equipment cabinet. Each Fixed CCTV Dome Camera consists of a solid state color CCTV Camera, zoom lens and all cabling required to interface the CCTV dome camera assembly with equipment in the field equipment cabinet. When the light level drops below a programmable level, the PTZ and Fixed cameras shall be capable of switching to black and white from color or remaining in color mode.
 6. Mounting hardware and all interconnecting cabling between the camera assembly and the field cabinet shall also be provided as part of this item. The camera assembly shall be designed for mounting on a CCTV pole, platform canopy, structure or wall as specified in the contract documents. Adapter plates, where required, shall be provided as part of this item. Connections between the equipment shall be through weather proof connectors to provide easy replacement. Servicing of the camera assembly shall be available in the continental United States or Canada.

7. All conduits, cabling, hardware and other items not specifically called out elsewhere in the Contract Documents that are required for a complete and fully functioning PTZ or Fixed CCTV Dome Camera as described in the Specifications and Contract Documents shall be provided by the Contractor as part of these items.
- B. Fixed CCTV Camera shall be Axis model Q3505-VE, or equivalent meeting the following requirements:
1. Camera Image Sensor shall be 1/2.8" Progressive Scan RGB CMOS, and IR Sensitive.
 2. Lens:
 - a. Varifocal, Remote focus & zoom, IR-corrected, megapixel, P-iris control
 - b. Focal Length Options:
 - i. 3-9 mm, 105°-35° (horizontal), F1.3
 - ii. 9-22 mm, 33°-16° (horizontal), F1.6
 - c. Final lens selection shall be coordinated with field conditions
 3. Zoom shall be a minimum of 3x Optical; 2x Digital
 4. Effective Pixels shall be a minimum of 2.3 megapixels (1080p)
 5. Minimum Illumination:
 - a. Color: 0.18 lx at F1.3 (with WDR)
 - b. B/W: 0.04 lx at F1.3 (with WDR)
 6. Day and night visibility, cameras must have an automatic removable infrared-cut filter.
 7. The Wide Dynamic Range (WDR) shall be up to 120dB
 8. Shutter time shall be in between 1/42850 s to 2 s
 9. Video Compression:
 - a. H.264 (MPEG-4 Part 10/AVC)
 - b. Motion JPEG
 10. Resolution capabilities of 1920 x 1200 to 160 x 90 with aspect ratio options of 4:3 and 16:9
 11. Frame Rate:
 - a. With WDR - 30fps and low light enhancement
 - b. Without WDR - Up to 60fps at 1080p resolution.
 12. Video Streaming:
 - a. Multiple, simultaneous, individually-configurable
 - b. H.264: Baseline, Main, and High profiles
 - c. Motion JPEG
 - d. The camera shall support both Maximum Bit Rate (MBR) and Variable Bit Rate (VBR) in H.264 and provide configurable compression levels.
 13. Supported Protocols includes IPv4/v6, TCP, UDP, NTP, RTSP, HTTP, HTTPS, SSL/TLS, FTP, SMTP, DNS, SOCKS, SSH, RTP, RTCP, DHCP

14. Camera ID can be up to 20 characters being alphanumeric characters and marks.
 15. Network Interface: 10Base-T/100Base-TX PoE, RJ-45 connector
 16. Inputs and Outputs
 - a. 2 configurable I/O ports, accessible via terminal block.
 - b. Configurable normally open or normally closed
 17. Power over Ethernet (PoE) 802.3af 11.4W max
 18. Memory: 512 MB RAM, 128 MB Flash
 19. Open API for software integration; ONVIF Profile S
 20. Event Triggers: Video motion detection, External input, Edge storage events, Shock detection, Fan, PTZ moving, PTZ preset
 21. Image Settings: Electronic image stabilization, automatic defog, white balance (auto and manual), backlight compensation, image rotation, low light compensation, exposure control, privacy masks.
 22. Video Transmission: HTTP (Unicast), HTTPS (Unicast), RTP (Unicast & Multicast), RTP over RTSP (Unicast), RTP over RTSP over HTTP (Unicast)
 23. Environmental: -40°C to +50°C (-40°F to +122°F), 10-100% RH (condensing)
 24. EMC Approvals: FCC Part 15 - Subpart B Class A
 25. Railway EMC Approvals: EN 50121-4, IEC 62236-4
 26. The camera shall be an outdoor, vandal-resistant network dome camera. The enclosure shall include an aluminum casing with encapsulated electronics and meet the requirements of IEC/EN 60529 IP66, NEMA 250 Type 4X, and IEC/EN 62262 IK10. Enclosure shall include sunshield, temperature sensor, heater, and fan.
 27. The camera shall feature a black and white mode that may be automatically engaged on low light level and permit the use of an external infrared illuminator or manually selected. The camera shall incorporate independent automatic color-to-black and white switching modes for switchover on light threshold and sensitivity to IR illumination. Automatic color-to-black and white switching shall have selectable light level thresholds (high or low) and duration settings for the selected threshold before automatic switchover occurs.
- C. Contractor shall survey all locations that require IR Illuminators and provide a mounting detail for the mounting method for the IR lights. Where required, provide manufacturer brackets to

support the installation method and location. The detail design shall be approved by the engineer prior to the start of work.

1. Type: LED
2. Angle: 10° / 35° / 60° via interchangeable lenses
3. Wavelength: 850 nm / 940 nm as shown on the plans
4. Dimensions (typ.): 5" x 7" x 3.2"
5. Voltage Input: 12/24 V AC/DC
6. Power Consumed (max.): 48W
7. Environmental: IP66 rated, -50°C to +50°C (-58°F to 122°F)

D. General Requirements for Camera Housings and Mounts:

1. Furnish a mount for every camera being furnished and installed under this Contract. The mount shall be designed for use with the camera, and for conditions at the installation location
2. Furnish conduit adapters and related items as required.
3. For railroad applications where the camera is accessible to the public, the mount and mounting method shall be rated for heavy duty, capable of supporting a load of no less than 300 pounds, and be of sturdy construction. It shall be suitable for indoor and outdoor applications, and have an appearance which matches the surrounding area. The mount shall be made of steel. All hardware shall be tamper resistant. The mount shall have a heavy duty stainless steel adjustable head, capable of being locked after adjustment.
4. Smoked domes shall be used in all public areas and as shown on the Contract Drawings.

E. Special Provisions for Pendant Mounted Cameras

1. Install all pendant mounted cameras so that they are located as close as possible to the ceiling without obstruction of their field of view by architectural, structural, and/or any other elements. Submit plans for mounting pendant cameras to Engineer for approval.

F. Environmental:

1. Must meet all performance requirements when subjected to a 90 mph wind and able to withstand a 127 mph wind

2.4 EQUIPMENT RACK

- A. Provide a free standing rack to house surge suppressor, Media Converter, Network switch NVR Server/DVD burner, power supply, fold out keyboard and 17"LCD monitor.
 - a. Network Switch Dimension: 6.12" x 6.12" x 5.09"
 - b. NVR Dimension:
- B. Rack shall be a steel free standing enclosure with side covers, front and rear doors, sized to fit all needed equipment, nominal and include 40 rack units.
- C. Provide service light, vertical power strip (entire height of rack), and cable management ladder.
- D. Provide cooling fans and temperature monitor with a thermostat.
- E. Removal covers for conduit connections
- F. Lockable doors with a combination lock.
- G. Internal power distribution

2.5 NETWORK SWITCH

- A. Ethernet Switches to be considered are Cisco Ethernet Switches: IE Series or Approved Equal. Contractor will specify amount needed based on station's needs:
 - 1. Cisco IE 4000
 - 2. Approved Equal
- B. Product Description
 - 1. The following minimum requirements shall be met for the switch configurations:
 - a. Rugged Industrial Ethernet switch w/ 4 Fast Ethernet (FE) SFP Ports, 8 10/100 PoE/PoE+ ports, and 4 dual-purpose SFP Gigabit Ethernet (GigE) Uplinks
 - b. High-Voltage AC/DC Power Source
 - c. 1000 Mbps Single-Mode Rugged SFP
 - d. Cisco IE 4000 IP Services License
 - e. Cisco Console Cable 6 ft. USB Type A to Mini-B
 - f. SMARTNET Warranty Service

2.6 NETWORK VIDEO RECORDER WITH DVD BURNER (NVR)/VIDEO MANAGEMENT SYSTEM (VMS)

- A. VMS/NVR System Manufacturers for consideration shall be:
 - 1. NICE
 - 2. Cisco (Broadware)
 - 3. Verint

4. Approved Equal

B. NVR Storage

1. NVR storage requirements will vary based on the VMS/NVR system software selected. Storage shall meet or exceed the VMS/NVR system manufacturer's recommended specifications and the following:
 - a. 4Gb fibre channel or direct attached SAS
 - b. RAID Controller (RAID 0+1, 1, 3 or 5). NVR storage shall be configured for RAID 5 or better.
 - c. Dual redundant, hot-swappable power supplies
 - d. Manufactured by IBM, Dell, or approved equal.
 - e. Internal storage: 12 Terabyte hard disk drive.
 - i. Video and audio recording over TCP/IP network.
 - ii. Video recording of H.264, MJPEG, and MPEG-4 IP Streams.
 - iii. Video recording up to 280 Mbps available throughput.
 - iv. Continuous and Alarm-based recording with 30 day archive.
 - v. Internal RAID-5 storage or non-RAID storage of up to 1500 GB

C. Additional Software Requirements

1. Virus Protection Software
 - a. All servers and workstations shall be furnished with virus protection software. The Contractor shall install and configure the software.
 - b. Software shall be McAfee Virus Scan Enterprise Edition or approved equal.
2. Web Browser
 - a. All servers and workstations shall be furnished with Microsoft Internet Explorer, version 8 (or latest release supported by VMS).
3. Documents Viewers
 - a. All servers and workstations shall be furnished with Adobe Acrobat Reader.
4. Office Suite
 - a. All servers and workstations shall be furnished with Microsoft Office Professional 2007 or later.
5. Utility Programs
 - a. All servers and workstations shall have be furnished with the latest version of the following utility programs:
 - i. File Compression Utility: WinZip, latest release.
 - ii. Media Player: Microsoft Media Player, latest release.
 - iii. Media Player: Apple QuickTime Player, latest release.
 - iv. Media Player: Real Networks Real Player, latest release.
6. Other Requisite Programs
 - a. The contractor shall furnish, install, and configure any additional software required for use of the System. This includes, but is not limited to, operating systems, database software, runtime files, additional media players, etc.

D. Related Items

1. Furnish 10 DVDs suitable for recording high quality images at each NVR locations. The DVDs shall be a single layer suitable for recording at 16X speed manufactured by Memorex or approved equal. Each DVD shall have a storage capacity of 4.7GB minimum.

E. KVM Console

1. Furnish and install KVM console switch for all head-end servers. Provide all cabling from KVM console to each server.
2. KVM console shall meet or exceed the following specifications:
 - a. Integrated 1U rackmount KVM switch with a 19" LCD screen, keyboard, touchpad, and ports for at least 8 servers. Console shall support connections to additional consoles or KVM switches.
 - b. (2) USB ports for connection of external mouse or keyboard.
 - c. Support resolutions of 1280x1024.
 - d. Compatible with all major operating systems.
 - e. Support two-level security (administrator vs. user).
 - f. Auto-scan for discovery of connected systems.
 - g. Switch ports via console pushbuttons, hotkey keyboard commands, or the on-screen display.
 - h. Tripp Lite B020-U08-19-K or approved equal.

2.7 NETWORK MANAGEMENT SYSTEM

A. Network Management System (NMS) shall have:

1. The NMS shall be a standalone system running on a computer server or dedicated appliances. The NMS software shall be the latest version of Cisco Prime Infrastructure or approved equal.
2. The NMS shall include Cisco Prime LAN Management Solution and Cisco Prime Network Control System.
3. The NMS shall manage all network switches and routers provided under this contract.
4. Contractor shall provide the necessary licenses to management all switches/routers/SNMP devices plus 20% spare, servers, client workstations for complete NMS solution. The NMS server and client workstation shall meet the required configuration per manufacturer recommendation for optimum performance.
5. The NMS shall support industry standard technologies, such as NetFlow, Network Based Application Recognition (NBAR), Medianet, Performance Agent, and Simple Network Management Protocol (SNMP).

6. The NMS shall also support integration with Cisco Prime Network Analysis Module (NAM) to permit the collection and correlation of granular flow and packet based data from one NAM or many to enable analysis and troubleshooting of application and network problems.
7. The NMS shall support the following devices:
 - a. Cisco Integrated Services Routers (ISRs)
 - b. Cisco Aggregation Services Routers (ASRs)
 - c. Cisco Catalyst® Switches
 - d. Cisco Network Analysis Modules
 - e. Cisco Wide Area Application Services (WAAS)
 - f. Cisco Nexus® Switches
 - g. Cisco MDS 9000 Series Multilayer Switches
 - h. Cisco Mobility Service Engine (MSE)
 - i. Cisco Wireless LAN Controllers
 - j. Cisco Lightweight Access Points
 - k. Cisco Autonomous Access Points
 - l. And ability to discover and monitor third-party (non-Cisco) switches that support IETF RFC 1213 and wireless controllers/access points from Aruba Networks.
8. The NMS shall provide the following network management capabilities:
 - a. Inventory and topology management
 - b. Device configuration and administration
 - c. Device configuration and image management
 - d. Audit and compliance management
 - e. Performance and health monitoring
 - f. Reporting

2.8 UNINTERRUPTABLE POWER SUPPLY (UPS):

- A. An external UPS circuit shall be provided sized to provide 90 minutes operation of the security system under normal operating conditions (recording).
- B. Provide all load information for UPS sizing calculations, including each piece of security equipment, to support same equipment for 90 minutes.

2.9 RACK MOUNTED POWER SUPPLIES

- A. Provide two rack mounted power supplies Pelco RCS series or equal to power the cameras. Power supply shall have the following features:
 1. 26 volt output AC.
 2. Main LED indicator
 3. Self-resetting circuit breakers.
 4. Removable terminal strips with clamp down connectors.

2.11 REMOTE VSS ENCLOSURES

- A. NEMA 4 vandal resistant, freestanding enclosure shall be supplied for parking lot cameras. It shall include incoming power circuit breaker and or fusing for the following components:
 - 1. Ethernet Switch for up to 48 (POE) connected camera
 - 2. Media Converter for communication back to head end equipment within the Telecom room.
 - 3. UPS power supply
 - 4. Cabinet heater and ventilation fan

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.
- B. Examine roughing-in for LAN, WAN, and IP network before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."
- B. Wiring Method: Install cables in RGS conduit unless otherwise indicated.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- E. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras and infrared illuminators level and plumb.
- B. Install cameras with 84-inch minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.

- C. Set final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.
- D. Avoid ground loops by making ground connections only at the control station.
- E. Identify system components, wiring, cabling, and terminals according to Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
 - a. Prepare equipment list described in "Informational Submittals" Article.
 - b. Verify operation of auto-iris lenses.
 - c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
 - d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
 - e. Set and name all preset positions; consult Owner's personnel.
 - f. Set sensitivity of motion detection.
 - g. Connect and verify responses to alarms.
 - h. Verify operation of control-station equipment.
 - 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 30 days. Provide a minimum of 10 days' notice of test schedule.
 - 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

- D. Video surveillance system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:
 - 1. Check cable connections.
 - 2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
 - 3. Adjust all preset positions; consult Owner's personnel.
 - 4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
 - 5. Provide a written report of adjustments and recommendations.

3.6 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.
- B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to provide 8 hours on site to train Owner's maintenance personnel. The training shall include the following:
 - 1. An intensive course covering setup, retrieval, adjusting, operating, and maintaining video-surveillance equipment learning on the installed commissioned systems.

END OF SECTION 282301